

## **GSOM/GSOY (Global Summary of the Month/Global Summary of the Year)**

### **I. Description**

The Global Summary of the Month (GSOM) and Global Summary of the Year (GSOY) datasets consist of 55 climatological variables computed from summary of the day observations of the Global Historical Climatology Network Daily dataset. Of these, 53 are monthly and annual summary variables and two are season-to-date variables.

### **II. Format/Observation Definitions**

Users are given the choice between the following two delivery formats:

- 1) Portable Document Format (PDF) output.
- 2) CSV file for use in spreadsheet applications. Users will be able to choose between standard or metric units with this option.

#### **A. Data observations**

Each record represents all selected observations (i.e. elements) available for a given station-month. The initial section of each record is ordered as follows with the following definitions:

**STATION** (17 characters) is the station identification code.

**STATION\_NAME** (max 50 characters) is the name of the station (usually city/airport name). This is an optional output field.

**GEOGRAPHIC\_LOCATION** (31 characters) is the latitude (decimated degrees w/northern hemisphere values > 0, southern hemisphere values < 0), longitude (decimated degrees w/western hemisphere values < 0, eastern hemisphere values > 0) and elevation above mean sea level (thousandths of meters). This is an optional output field.

**DATE** is the year of the record (4 digits) followed by month (2 digits) and day (2 digits).

#### **Table A (variables)**

**TMAX** – Monthly/Annual Maximum Temperature. Average of daily maximum temperature given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

**TMIN** – Monthly/Annual Minimum Temperature. Average of daily minimum temperature given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

TAVG – Average Monthly/Annual Temperature. Computed by adding the unrounded monthly/annual maximum and minimum temperatures and dividing by 2. Given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

EMXT – Extreme maximum temperature for month/year. Highest daily maximum temperature for the month/year. Given in Celsius or Fahrenheit depending on user specification.

DYXT – Day of the EMXT for the month/year.

EMNT – Extreme minimum temperature for month/year. Lowest daily minimum temperature for the month/year. Given in Celsius or Fahrenheit depending on user specification.

DYXT – Day of the EMNT for the month/year.

DX90 – Number of days with maximum temperature  $\geq 90$  degrees Fahrenheit/32.2 degrees Celsius.

DX70 – Number of days with maximum temperature  $\geq 70$  degrees Fahrenheit/21.1 degrees Celsius.

DX32 – Number of days with maximum temperature  $\leq 32$  degrees Fahrenheit/0 degrees Celsius.

DT32 – Number of days with minimum temperature  $\leq 32$  degrees Fahrenheit/0 degrees Celsius.

DT00 – Number of days with maximum temperature  $\leq 0$  degrees Fahrenheit/-17.8 degrees Celsius.

HTDD - Heating Degree Days. Computed when daily average temperature is less than 65 degrees Fahrenheit/18.3 degrees Celsius.  $HDD = 65(F)/18.3(C) - \text{mean daily temperature}$ . Each day is summed to produce a monthly/annual total. Annual totals are computed based on a July – June year in Northern Hemisphere and January – December year in Southern Hemisphere. Given in Celsius or Fahrenheit degrees depending on user specification.

CLDD - Cooling Degree Days. Computed when daily average temperature is more than 65 degrees Fahrenheit/18.3 degrees Celsius.  $CDD = \text{mean daily temperature} - 65 \text{ degrees Fahrenheit}/18.3 \text{ degrees Celsius}$ . Each day is summed to produce a monthly/annual total. Annual totals are computed based on a January – December year in Northern Hemisphere and July – June year in Southern Hemisphere. Given in Celsius or Fahrenheit degrees depending on user specification.

PRCP – Total Monthly/Annual Precipitation. Given in inches or millimeters depending on user specification. Measurement Flags: T is used for trace amount, a is used for any accumulation within a month/year that includes missing days. If no days are missing, no flag is used. Source Flag: Source flag from GHCN-Daily (see separate documentation for GHCN-Daily). Days Miss Flag: Number of days missing or flagged.

EMXP – Highest daily total of precipitation in the month/year. Given in inches or millimeters depending on user specification.

DYXP – Day that EMXP for the month/year occurred.

DP01 – Number of days with  $\geq 0.01$  inch/0.254 millimeter in the month/year.

DP05 – Number of days with  $\geq 0.5$  inch/12.7 millimeters in the month/year.

DP10 – Number of days with  $\geq 1.00$  inch/25.4 millimeters in the month/year.

SNOW – Total Monthly/Annual Snowfall. Given in inches or millimeters depending on user specification. Measurement Flags: T is used for trace amount, a is used for any accumulation within a month/year that includes missing days. If no days are missing, no flag is used. Source Flag: Source flag from GHCN-Daily (see separate documentation for GHCN-Daily). Days Miss Flag: Number of days missing or flagged.

EMSN – Highest daily snowfall in the month/year. Given in inches or millimeters depending on user specification.

DYSN – Day EMSN for the month/year occurred.

DSNW – Number of days with snowfall  $\geq 1$  inch/25 millimeters.

DSND – Number of days with snow depth  $\geq 1$  inch/25 millimeters.

EMSD – Highest daily snow depth in the month/year. Given in inches or millimeters depending on user specification.

DYSD – Day EMSD for the month/year occurred.

EVAP – Total Monthly/Annual Evaporation. Given in inches or millimeters depending on user specification. Measurement Flags: T is used for trace amount, a is used for any accumulation within a month/year that includes missing days. If no days are missing, no flag is used. Source Flag: Source flag from GHCN-Daily (see separate documentation for GHCN-Daily). Days Miss Flag: Number of days missing or flagged.

MNPN – Monthly/Annual Mean Minimum Temperature of evaporation pan water. Given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

MXPN – Monthly/Annual Mean Maximum Temperature of evaporation pan water. Given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WDMV – Total Monthly/Annual Wind Movement over evaporation pan. Given in miles or kilometers depending on user specification. Days Miss Flag: Number of days missing or flagged.

TSUN – Daily total sunshine in minutes. Days Miss Flag: Number of days missing or flagged.

PSUN – Monthly/Annual Average of the daily percents of possible sunshine. Days Miss Flag: Number of days missing or flagged.

AWND – Monthly/Annual Average Wind Speed. Given in miles per hour or meters per second depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WSFM – Maximum Wind Speed/Fastest Mile. Maximum wind speed for the month/year reported as the fastest mile. Given in miles per hour or meters per second depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WDFM – Wind Direction for Maximum Wind Speed/Fastest Mile (WSFM). Given in 360-degree compass point directions (e.g. 360 = north, 180 = south, etc.).

WSF2 – Maximum Wind Speed/Fastest 2-minute. Maximum wind speed for the month/year reported as the fastest 2-minute. Given in miles per hour or meters per second depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WDF2 – Wind Direction for Maximum Wind Speed/Fastest 2-Minute (WSF2). Given in 360-degree compass point directions (e.g. 360 = north, 180 = south, etc.).

WSF1 - Maximum Wind Speed/Fastest 1-minute. Maximum wind speed for the month/year reported as the fastest 1-minute. Given in miles per hour or meters per second depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WDF1 – Wind Direction for Maximum Wind Speed/Fastest 1-Minute (WSF1). Given in 360-degree compass point directions (e.g. 360 = north, 180 = south, etc.). Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WSFG – Peak Wind Gust Speed. Maximum wind gust for the month/year. Given in miles per hour or second depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WDFG – Wind Direction for Peak Wind Gust Speed (WSFG). Given in 360-degree compass point directions (e.g. 360 = north, 180 = south, etc.). Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WSF5 – Peak Wind Gust Speed – Fastest 5-second wind. Maximum wind gust for the month/year. Given in miles per hour or second depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WDF5 – Wind Direction for Peak Wind Gust Speed – Fastest 5-second (WSF5). Given in 360-degree compass point directions (e.g. 360 = north, 180 = south, etc.). Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WSF3 – Peak Wind Gust Speed – Fastest 3-second wind. Maximum wind gust for the month/year. Given in miles per hour or second depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

WDF3 – Wind Direction for Peak Wind Gust Speed – Fastest 3-second (WSF3). Given in 360-degree compass point directions (e.g. 360 = north, 180 = south, etc.). Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

MXyz – Monthly/Annual Mean of daily maximum soil temperature given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

MNyz - Monthly/Annual Mean of daily minimum soil temperature given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

HXyz – Highest maximum soil temperature for the month/year given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

HNyz – Highest minimum soil temperature for the month/year given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

LXyz – Lowest maximum soil temperature for the month/year given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

LNyz – Lowest minimum soil temperature for the month/year given in Celsius or Fahrenheit depending on user specification. Missing if more than 5 days within the month are missing or flagged or if more

than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

“y” values for HXyz, HNyz, LXyz, and LNyz are as follows:

1=grass  
2=fallow  
3=bare ground  
4=brome grass  
5=sod  
6=straw mulch  
7=grass muck  
8=bare muck  
0=unknown

“z” values for HXyz, HNyz, LXyz, and LNyz are as follows:

1= 2 inches or 5 centimeters depth  
2= 4 inches or 10 centimeters depth  
3= 8 inches or 20 centimeters depth  
4= 20 inches or 50 centimeters depth  
5= 40 inches or 100 centimeters depth  
6= 60 inches or 150 centimeters depth  
7= 72 inches or 180 centimeters depth  
other=unknown

HDSD – Heating Degree Days (season-to-date). Running total of monthly heating degree days through the end of the most recent month. Each month is summed to produce a season-to-date total. Season starts in July in Northern Hemisphere and January in Southern Hemisphere. Given in Celsius or Fahrenheit degrees depending on user specification.

CDSD – Cooling Degree Days (season-to-date). Running total of monthly cooling degree days through the end of the most recent month. Each month is summed to produce a season-to-date total. Season starts in January in Northern Hemisphere and July in Southern Hemisphere. Given in Celsius or Fahrenheit degrees depending on user specification.

FZFx (x= 0-9) – First/Last Freeze Days. Annual element only. Years begins on August 1. Missing if more than 5 days within the month are missing or flagged or if more than 3 consecutive values within the month are missing or flagged. DaysMissing: Flag indicating number of days missing or flagged (from 1 to 5).

Given in format tttt.tyyyyymmdds where tttt.t is temperature in degrees Fahrenheit or Celsius depending on user specification, yyyy is the year, mm is the month, dd is the day of the month and s is a source flag.

“x” values for HXyz, HNyz, LXyz, and LNyz are as follows:

0 = first minimum temperature <= 32 degrees Fahrenheit/0 degrees Celsius

- 1 = first minimum temperature  $\leq 28$  degrees Fahrenheit/ $-2.2$  degrees Celsius
- 2 = first minimum temperature  $\leq 24$  degrees Fahrenheit/ $-4.4$  degrees Celsius
- 3 = first minimum temperature  $\leq 20$  degrees Fahrenheit/ $-6.7$  degrees Celsius
- 4 = first minimum temperature  $\leq 16$  degrees Fahrenheit/ $-8.9$  degrees Celsius
- 5 = last minimum temperature  $\leq 32$  degrees Fahrenheit/ $0$  degrees Celsius
- 6 = last minimum temperature  $\leq 28$  degrees Fahrenheit/ $-2.2$  degrees Celsius
- 7 = last minimum temperature  $\leq 24$  degrees Fahrenheit/ $-4.4$  degrees Celsius
- 8 = last minimum temperature  $\leq 20$  degrees Fahrenheit/ $-6.7$  degrees Celsius
- 9 = last minimum temperature  $\leq 16$  degrees Fahrenheit/ $-8.9$  degrees Celsius